INSTRUCTION MANUAL

B+K PRECISION 2815

3½-DIGIT LCD MULTIMETER

B+K PRECISION DYNASCAN CORPORATION

TEST INSTRUMENT SAFETY

WARNING

Normal use of test equipment exposes you to a certain amount of danger from electrical shock because testing must often be performed where exposed voltage is present. An electrical shock causing 10 milliamps of current to pass through the heart will stop most human heartbeats. Higher voltages pose an even greater threat because such voltages can more easily produce a lethal current. However, voltage as low as 35 volts DC or AC RMS should be considered dangerous and hazardous since it can produce a lethal current under certain conditions. Your normal work habits should include all accepted practices that will prevent contact with exposed high voltage, and that will steer current away from your heart in case of accidental contact with a high voltage. You will significantly reduce the risk factor if you know and observe the following safety precautions:

1. Don't expose high voltage needlessly. Remove housings and covers only when necessary. Turn off equipment while making test connections in high voltage circuits. Discharge high voltage capacitors after removing power.

2. Use an insulated floor material or a large, insulated floor mat to stand on, and an insulated work surface on which to place equipment; and make certain such surfaces are not damp or wet. Where insulated floor surface is not available, wear heavy gloves.

3. Use the time-proven "one hand in the pocket" technique while handling an instrument probe. Be particularly careful to avoid contacting a nearby metal object that could provide a good ground return path.

4. Always use an isolation transformer to power transformerless "hot chassis" equipment, where one side of the AC power line is connected directly to the chassis. This includes most recent television sets and audio equipment. Without an isolation transformer, the chassis of such equipment may be floating at line voltage (120 VAC, 60 Hz in USA), depending upon which way the 2-wire AC power plug is inserted. Not only does this present a dangerous shock hazard if the chassis is touched, but damage to test instruments or the equipment under test may result from connecting the ground lead of some test instruments to a "hot" chassis. The ground lead of most oscilloscopes and most other test instruments with 3-wire power plugs is an earth ground.

(continued on inside of back cover)

INSTRUCTION MANUAL

FOR
MODEL 2815

3½-DIGIT
LCD
MULTIMETER

B+K PRECISION DYNASCAN CORPORATION

6460 West Cortland Street
Chicago, Illinois 60635

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INTRODUCTION

The **B & K-PRECISION** Model 2815 LCD Multimeter is a significant contribution to the instrumentation market. Low cost and high performance have been engineered into this instrument to provide the engineer, technician, maintenance and service personnel, and training institutions a digital multimeter that is competitively priced with existing analog and digital meters.

The basic instrument has been designed for maximum simplicity of operation and minimum error of reading, with the inclusion of automatic offset correction ("Auto-Zero") and automatic polarity switching ("Auto-Polarity"), as well as simple range interpretation and high resolution.

The basic design features of this instrument make it an ideal replacement for existing multimeters and FET/VOM's. The instrument measures DC and AC voltage, DC and AC current and ohms. It has high input impedance (10 megohms) on all voltage ranges, and a wide resistance measurement range (20 ohms full scale to 20 megohms full scale). The 20-ohm range provides measurement resolution to .01 ohm. To maximize the effectiveness of this range, an independent zero adjust control is provided to null out the test lead resistance when performing very low resistance measurements.

In addition to providing equivalent functions and ranges, the inherent accuracy and features of this instrument provide a significant margin of improved performance over comparably priced meters. The proven stability of dual-slope integration is combined with the precision of ratio-trimmed resistor networks and advanced L.S.I. technology, while the isolation allowed by battery operation makes the Model 2815 less susceptible to common-mode errors and noise than comparable AC-powered meters.

A selectable HI/LO ohms feature permits making in-circuit resistance measurements at voltage levels below the conduction threshold of semiconductors. The HI ohms feature permits semiconductor junction test by measurement of forward and reverse ratios.

The overload protection system was designed to provide maximum protection of the instrument with minimum user inconvenience, in the event of extreme overload accidents. The only part that may be damaged by most common mistakes is a fuse.

SPECIFICATIONS

DC VOLTAGE

Ranges	±0-100mV, 1V, 10V, 100V, 1000V.
Overrange (Full Scale)	100% on all ranges, limited to ±1000V max.
Accuracy	±0.1% of reading, ±1 least significant digit (LSD), on all ranges.
Input Impedance	10 megohms.
Polarity Indication	Automatic: minus sign displayed, plus sign implied.
Circuit Protection	1000VDC or DC + AC peak.

AC VOLTAGE

(Average-responding circuitry calibrated to read RMS value of pure sine wave.)

Ranges	0-100mV, 1V, 10V, 100V, 1000V.
Overrange (Full Scale)	100% on all ranges, limited to 750V RMS max.

Accuracy

Ranges	50-500Hz	500-1kHz	1kHz-5kHz
100mV-100V	±0.3% of rdg ± 3LSD	±1% of rdg ± 3 LSD	±1dB
1000V	±1% of rdg ± 3LSD		

Input Impedance	10 megohms.
Circuit Protection	1000V peak or DC + AC peak.

DC CURRENT

Ranges	±0-100μA, 1mA, 10mA, 100mA, 1000mA.
Overrange (Full Scale)	100% on all ranges.
Voltage Drop (Measured across input terminals)	Nominal 200mV at full scale on 100μA, 1mA, 10mA, 100mA ranges. Nominal 700mV at full scale on 1000mA range.
Accuracy	±0.75% of reading, ±1 LSD, on all ranges.
Polarity Indication	Automatic: minus sign displayed, plus sign implied.
Circuit Protection	2A fuse and diodes.

AC CURRENT

Ranges	0-100μA, 1mA, 10mA, 100mA, 1000mA.
Overrange (Full Scale)	100% on all ranges.
Voltage Drop (Measured across input terminals)	Nominal 200mV RMS at full scale on 100μA, 1mA, 10mA, and 100mA ranges. Nominal 700mV RMS at full scale on 1000mA range.
Accuracy	±1% of reading, ±3 LSD, 50 Hz to 1kHz; ±2.5% of reading, ±3 LSD, to 5kHz.
Circuit Protection	2A fuse and diodes.

RESISTANCE

Ranges

0-10Ω, 100Ω, 1kΩ, 10kΩ, 100kΩ, 1000kΩ, 10MΩ.

Overrange (Full Scale)

100% on all ranges.

Polarity

V/Ω jack positive on all ranges.

Accuracy

±0.3% of reading, ±1 LSD, on 1kΩ thru 1000kΩ ranges.

±0.6% of reading, ±1 LSD, on 10MΩ range.

±1.5% of reading, ±1 LSD, on 10Ω and 100Ω ranges.

Test Voltage

RANGE	High or Low	at Full Scale	Open Circuit
10Ω	Low	0.12 max.	1.2 max.
100Ω	Low	0.12 max.	3.4 max.
1kΩ	High	0.7 min.	3.4 max.
10kΩ	Low	0.3 max.	1.2 max.
100kΩ	High	1.2 min.	3.4 max.
1000kΩ	Low	0.3 max.	1.2 max.
10MΩ	High	1.2 min.	3.4 max.

Circuit Protection

+1000V to −450 VDC or 300 VAC continuous, except 10Ω range which sinks ±1A (3A momentary) max.

GENERAL

Operating Temperature	0° to 55 °C, 18° to 28 °C for stated accuracy, 0 to 80% relative humidity.
Overrange Indication	A "1" is displayed when the input exceeds full scale.
Power Source	9V battery (NEDA 1604 or equiv.), or optional Battery Eliminator (BE-15).
Low Battery Warning	Displays "LO BAT" when battery is near end of useful life.
Battery Life	Typically 150 hours with Alkaline batteries.
Dimensions (HWD)	6.1 x 4.2 x 1.6" (15 x 11 x 4cm).
Weight	1 lb. (0,4 kg).
Accessories Included	2 test leads; spare fuses.
Optional Accessories	BE-15 Battery Eliminator.
	ES-28 10-Amp Current Shunt.
	LC-25 Carrying Case.
	PR-21 Isolation/Direct Probe (aids DC measurements in presence of RF).
	PR-23 RF Detector Probe, 15kHz to 250MHz.
	PR-28 High-Voltage Probe, 40kV DC max.; 20kV, 60Hz.
	TP-28 Temperature Probe, −50 °C to +150 °C and −58 °F to +302 °F.

CONTROLS AND FEATURES
(Refer to Fig. 1)

Power Switch. Turns unit ON and OFF.

Function Switch. Selects the type of measurement to be performed.

Range Switch. Selects the desired range for the measurement.

(10Ω) ZERO Control. Adjusts the display to 0.00 when the meter controls are set to 10Ω and the test leads are shorted together. The (10Ω) ZERO control has no effect in any other function.

≂ V/Ω Jack. "Hot" (+) input jack. In voltage measurements the test lead connected to this jack is normally applied to the potential point in the circuit most removed from signal ground or earth ground.

COM Jack. Common (−) connection to the instrument input; it should be connected to ground or a low impedance point when measuring voltage.

≂ mA Jack. "Hot" (+) input jack for both current functions.

LO BAT Indicator. Indicates when to replace 9V battery.

Minus Sign. A minus (−) indication will be displayed on DC Volts or DC current for a negative voltage or current respectively. Positive (+) polarity is implied and is not displayed. NOTE: The minus sign may flash with zero reading in any function.

Numerical Readouts. 3½ digit display. Except for the leading digit, each display indicates numerals from "0" to "9". Also serves as overrange indicator by displaying 1 when input exceeds value of 1999.

Battery Eliminator Jack. Input for optional AC adapter (BE-15).

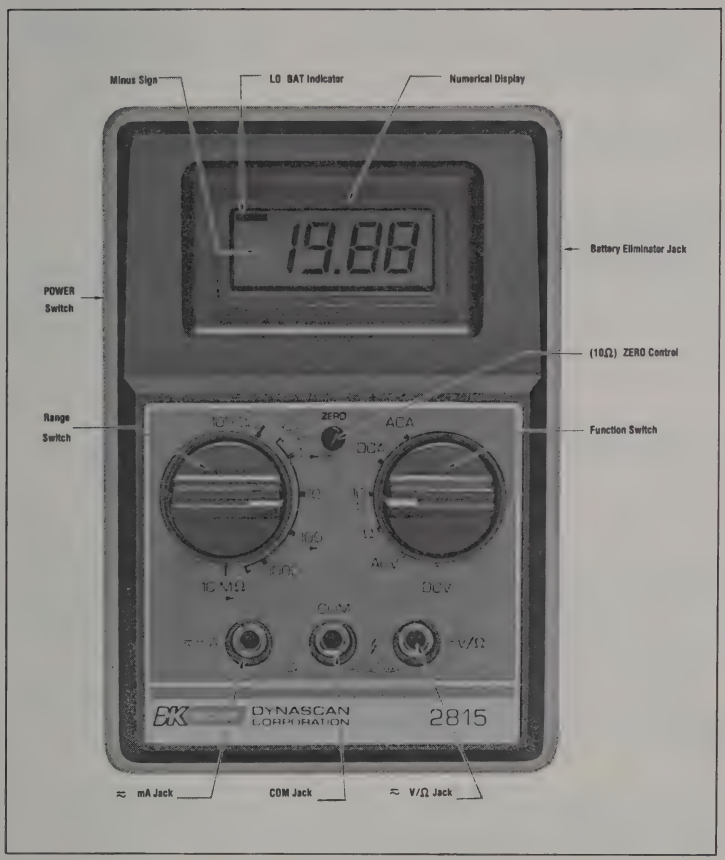

Fig. 1. Controls and indicators.

OPERATION

OPERATION WITH NON-RECHARGEABLE BATTERIES (Carbon-Zinc or Alkaline)

The 2815 can be powered by a NEDA 1604 type battery (see table in MAINTENANCE section). Alkaline is recommended although carbon-zinc will work with reduced battery life.

The LO BAT indicator will appear when battery is near end of useful life. See MAINTENANCE section for battery replacement instructions.

OPERATION WITH BATTERY ELIMINATOR

The **B & K-PRECISION** Model BE-15 is recommended. This is only a battery eliminator, *not a charger* (the battery is disconnected when the BE-15 is used). Be sure that the plug is firmly inserted into the jack of the 2815, then connect the BE-15 to a 120 volt 60Hz outlet. The 2815 signal inputs are still isolated from the 120 volts, but it is good practice to avoid common mode problems by not connecting the COM jack to points very far above or below ground potential.

PREPARATION AND CHECK

1. Plug the red test lead into the V/Ω, and the black test lead into the COM Jack.

2. Turn unit on.

3. Turn the Function switch to Ω (ohms).

4. Without a resistance connected across the test leads, the overrange indication should occur, causing the display to blank except for a leading "1" (and a decimal point, depending on range). Shorting the test leads should produce a zero reading, except on 100Ω range where a few tenths of an ohm should be seen due to lead and contact resistance.

5. Turn the Range switch to the 1kΩ range. Touch the red test lead to the mA jack: a reading of about .100 should appear. This checks the ohms function, one current range, and the 2A fuse (fuse replacement is described in MAINTENANCE section).

6. Turn the Range switch to the 10V range, and the Function switch to DCV. Touch the red (V/Ω) lead to the outermost part of the Battery Eliminator jack: a reading about −4 to −6.5 volts should appear. This checks the DCV function and the 1/16A fuse. (The voltage indicated depends principally on the battery voltage.)

7. Return Function switch to ACV or DCV and Range switch to 1000V. It is a good practice to leave the instrument in this position when not in use to prevent accidental overloads.

NOTES

1. The minus sign may flash with a zero reading in any function.

2. This meter and its liquid crystal display should provide years of valuable service. You can extend its life by avoiding prolonged exposure to either strong direct sunlight or high temperature, high humidity environments, such as the dash of a car on a hot sunny day.

WARNING

A certain amount of danger is always present when working on electrical equipment and therefore, the user is cautioned to heed the "Test Instrument Safety" information found on the inside covers of this manual.

Table 1 is provided as an aid in using the model 2815 and shows the upper limits and units for the various ranges. Note that the location of the decimal point changes with the position of the Range switch. The significance of the decimal location must be known to assure proper interpretation of readings obtained.

DC VOLTAGE MEASUREMENTS

1. Set Function switch to the DCV position. Connect test leads to the COM and V/Ω jacks.

2. Set Range switch as required for the voltage amplitude to be measured. If the magnitude of the voltage is not known, set the Range switch to the highest position (1000) and reduce the settings as required to obtain a satisfactory reading.

3. If the voltage exceeds that of the range selected, the overrange indication will operate. Select a higher voltage range.

Table 1

INTERPRETATION OF DIGITAL DISPLAY READINGS

TO MEASURE	FUNCTION SWITCH	RANGE SWITCH	DISPLAY FULL SCALE	READINGS ARE IN:	RESOLUTION**
DC VOLTS					
0-200mV		100mV	199.9	millivolts	100μV
0-2V		1V	1.999	volts	1mV
0-20V	DCV	10V	19.99	volts	10mV
0-200V		100V	199.9	volts	100mV
0-1000V*		1000V	1000*	volts	1V
AC VOLTS					
0-200mV		100mV	199.9	millivolts	100μV
0-2V		1V	1.999	volts	1mV
0-20V	ACV	10V	19.99	volts	10mV
0-200V		100V	199.9	volts	100mV
0-750V*		1000V	750*	volts	1V
DC CURRENT					
0-200μA		100μA	199.9	microamperes	100nA
0-2mA		1mA	1.999	milliamperes	1μA
0-20mA	DCA	10mA	19.99	milliamperes	10μA
0-200mA		100mA	199.9	milliamperes	100μA
0-2A		1000mA	1999	milliamperes	1mA
AC CURRENT					
0-200μA		100μA	199.9	microamperes	100nA
0-2mA		1mA	1.999	milliamperes	1μA
0-20mA	ACA	10mA	19.99	milliamperes	10μA
0-200mA		100mA	199.9	milliamperes	100μA
0-2A		1000mA	1999	milliamperes	1mA
OHMS					
0-20Ω	10Ω	10	19.99	ohms	10mΩ
0-200Ω	Ω	100Ω	199.9	ohms	100mΩ
0-2kΩ	Ω	1	1.999	kilohms	1Ω
0-20kΩ	Ω	10	19.99	kilohms	10Ω
0-200kΩ	Ω	100	199.9	kilohms	100Ω
0-2MΩ	Ω	1000	1999	kilohms	1kΩ
0-20MΩ	Ω	10MΩ	19.99	megohms	10kΩ

*Do not exceed input levels of 1000V (AC peak + DC, or DC).

**Resolution indicates the change in the measured value that is required to shift the least significant (right hand) digit one count.

AC VOLTAGE MEASUREMENTS

1. Place the Function switch in the ACV position. Connect test leads to the COM and V/Ω jacks.

2. Set the Range switch for the desired voltage. If the voltage exceeds that of the range selected, the overrange indication will operate. Select a higher voltage range.

RESISTANCE MEASUREMENTS

CAUTION

Do not attempt to measure resistance in a circuit in which the power is applied. Remove the power and make sure that all capacitors are discharged before attempting in-circuit resistance measurements.

Out-of-Circuit

1. Set the Function switch to the Ω position.

2. Set the Range switch to the desired position.

3. If the resistance value being measured exceeds the value of the range selected, the overrange circuitry is energized. Select a higher range.

4. In the highest ohms ranges, a slight instability of the reading may be observed due to pickup of radiation by the high impedance low current circuit. That instability may be minimized by avoiding noise or motion in conductors near the test leads, or by using shielded test leads such as the PR-21 accessory.

In-Circuit

Select a low-power ohms range (10Ω, 100Ω, 10kΩ, or 1000kΩ) when circuitry includes semiconductors that can confuse measurements if forward biased. High-power ohms ranges (1kΩ, 100kΩ, and 10MΩ) can turn on typical semiconductors.

Out-of-Circuit Semiconductor Tests

In addition to conventional resistance measurements, the high ohms ranges can be used to verify that a semiconductor junction is good by checking the front-to-back ratio.

1. Select the 1kΩ range.
2. Remove device from circuit.
3. Connect the test leads to the device (e.g. diode, base-emitter or base-collector junction) and then reverse the lead connections. Observe the meter reading for both conditions.

TEST RESULT	CONDITION
Overrange, both polarities	Junction open
Zero or low reading, both polarities	Junction shorted or leaky
Overrange in one direction and in-range reading in the other	Junction probably good

10-Ohms Range

1. Set both Function and Range switches to the 10Ω positions, as marked in color on front panel.
2. Clip the test lead ends together and adjust the 10Ω ZERO control for a display of 0.00. If meter does not zero properly, see hints in "TEST LEADS" paragraph of "MAINTENANCE" section.
3. Clip the test leads to the device to be measured, taking care that good contact is made at the test points.

DC CURRENT MEASUREMENTS

1. Place the Function switch in the DCA position. Connect test leads to the COM (−) & mA (+) jacks.
2. Place the Range switch in the desired current range position. Always set the Range switch to the highest position (1000mA) if the magnitude of current to be measured is not known.

CAUTION

Use care in making current measurements. Make sure that the meter is connected *in series* with the load in which the current is to be measured. Never connect the meter across a voltage source with the Function switch set for current. Doing so may either blow the overload protection fuse or damage the equipment under test.

When connecting the multimeter to read current, first remove power to the circuit. The following rules will insure that the proper current polarity is indicated.

- When inserting the multimeter between the positive side of the power source and the load, connect the mA lead to the power source and the COM lead to the load.
- When inserting the multimeter between the negative side of the power source and the load, connect the COM lead to the power source and the mA lead to the load.
- Apply power and read current.
- If the magnitude of the current being measured exceeds twice that indicated on the Range switch the overrange circuitry will operate. When this occurs, immediately remove power from the circuit under test and select a higher current range before proceeding further.
- If the polarity of the current being measured is negative, the polarity sensing circuit will be energized, and the value displayed will be preceded by a minus (–) sign.

NOTE

Current ranges are fuse-protected. If inoperative on all ranges, refer to MAINTENANCE section for fuse replacement.

AC CURRENT MEASUREMENTS

1. Set the Function switch to the ACA position. Connect test leads to the COM and mA jacks.
2. Set the Range switch to the desired position. If in doubt about the magnitude of the current to be measured, use the highest current range (1000mA) and then adjust the Range switch as required to obtain a satisfactory reading.
3. When connecting the multimeter for current measurements, remove the power from the circuit being tested while the connections are being made. Reapply the power and read current.
4. If the magnitude of the current being measured exceeds the range selected, the overrange circuitry will operate. When this occurs, immediately remove power from the circuit under test and select a higher current range before proceeding further.

NOTE

Current ranges are fuse-protected. If inoperative, refer to MAINTENANCE section on replacement.

THEORY OF OPERATION

(See Fig. 2)

The Model 2815 operates by converting the various types of input signals into a scaled DC voltage which is then transformed into a digital readout by the analog to digital (A/D) converter (ICs 1, 2 and 4).

Voltage inputs are applied across the 10-megohm voltage divider (resistor network RN1). A decade fraction of that voltage is selected by the range switch and, if set to the ACV function, is passed through a capacitively coupled AC-to-DC converter before it goes to a high-impedance buffer (in IC2). The remainder of the circuitry is basically a DC voltmeter, with a range of zero to ± 0.2 volt except when set to an ohms function. This voltmeter (A/D) operation is performed mainly by IC2 and consists of an automatic offset-correction (auto-zero) circuit, a dual-slope integrator, digital processing and display driving devices.

Resistance measurements are made by putting a precision resistor (the portion of the voltage divider selected by the Range switch) in series with the external resistance being measured. A small DC voltage is applied across the series combination, and the A/D converter computes and displays the ratio of the external to the internal voltage drops.

For current measurements, the input is passed through one of five small shunt resistances (1000 to 0.1 ohms) which drop up to 0.2 volt for a full scale reading. This voltage is applied to the A/D converter when in the DCA function; in ACA, the voltage goes first through the AC-to-DC converter where it is full-wave rectified, scaled and filtered, and the result is passed on to the A/D.

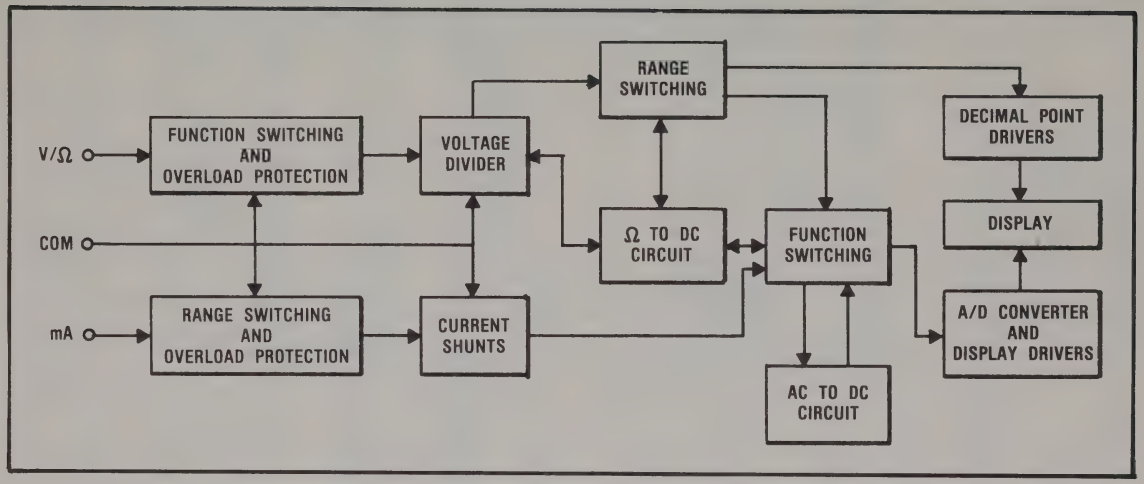

Fig. 2. Block diagram.

MAINTENANCE

WARNING

To avoid electrical shock, disconnect the test leads from external devices and from the input jacks before servicing.

OPENING THE CASE

Turn the unit off. Remove the screw from the back, and lift the back by the lower edge. If you need access only to the battery or fuse holders, skip down to the corresponding paragraph.

To remove the circuit board, hold the board and battery in place while you turn the unit face up and remove the nuts from the three input jacks. Note the way the ZERO adjustment shaft (for the 10Ω range) is seated in potentiometer R2. Be careful not to scratch the surface of the liquid crystal display or to displace it from its centered position in the clips. If the display is removed for any reason, care must be taken to keep it parallel to the circuit board at all times, to prevent distortion of the spring clips.

Be careful not to disturb the setting of R16 (near right-hand edge) accidentally.

BATTERY REPLACEMENT

Having removed the back as described above, check that the power switch is turned off (down i.e. toward battery area). Install or replace the battery using the mating snap-on clips. Make sure it is seated properly in the space provided before replacing rear cover.

An Alkaline battery is recommended for this product. Carbon-Zinc or Alkaline types should be removed immediately when they test low, to prevent instrument damage from battery leakage.

9V "TRANSISTOR" BATTERIES.

TYPE	NEDA	Burgess	Eveready	Mallory	Panasonic	Ray-O-Vac
Carbon-Zinc	1604	2U6	216	—	006P	1604
Alkaline	1604A	—	522	MN1604	6AM6	—

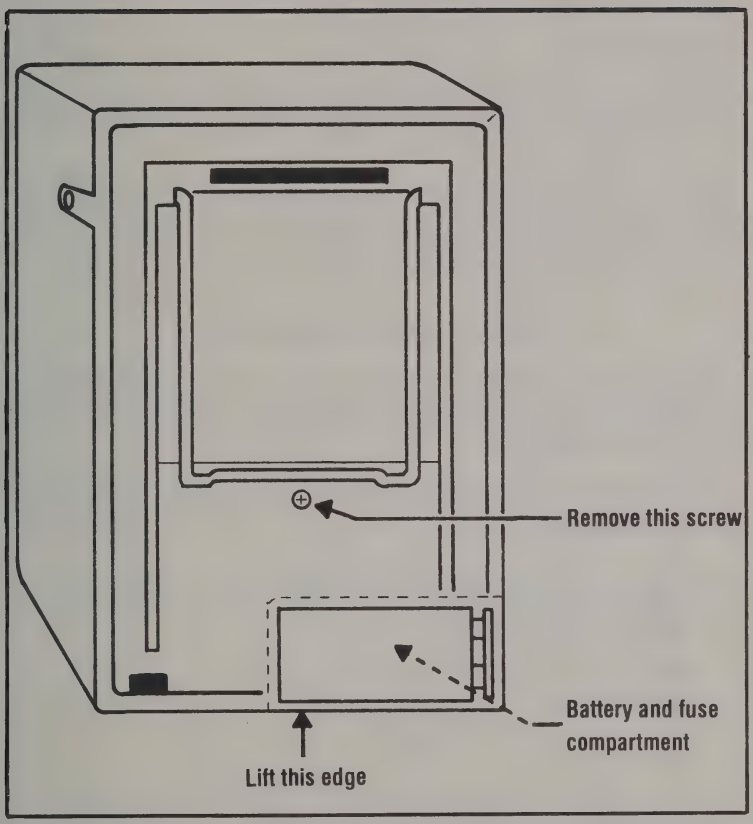

Fig. 3. Removing back cover.

FUSE REPLACEMENT

If uncertain which fuse is open, follow the procedure detailed in "PREPARATION AND CHECK". Open the case as described above. Notice how the wires and clips are positioned as you lift out the battery and fuse holder assembly. The 1/16A fuse is connected with blue wires at each end, and the 2A fuse with yellow wires. Change only one fuse at a time (using same 3AG type), then recheck operation. Re-assemble carefully.

TEST LEADS

Periodically examine the test leads to ensure that the conductors are not intermittent or broken. Also make sure that good contact pressure exists at the test lead receptacles.

Since the 10Ω range is sensitive to very small resistances, problems with test leads or poor contact pressure are most likely to interfere with normal zero setting on this range. If you experience instability in the zero setting or cannot fully reach zero, check the test leads and receptacles for possible dirt, corrosion, or loose fit. Also check leads for broken strands.

CALIBRATION PROCEDURE

The instrument should not require calibration unless repairs have been made that change the factory calibration. Prior to calibration the instrument should be checked for proper operation of all functions and for damage from physical abuse or excessive overloads.

The following procedure requires a low-impedance constant-voltage source of 0.01% accuracy or better. Use of sources with less accuracy reduces the accuracy of the instrument.

Refer to MAINTENANCE section for the disassembly procedure. Refer to Fig. 5 for location of internal adjustments. It is important that this procedure be followed in the order given below:

1. Set unit to DCV 100mV range.
2. Apply + 190mV to input and adjust R16 for a reading of 190.0.
3. Set unit to ACV.
4. Apply 190mV RMS low distortion sine wave (any frequency between 50 and 400Hz) and adjust R35 for a reading of 190.0.
5. Re-assemble.

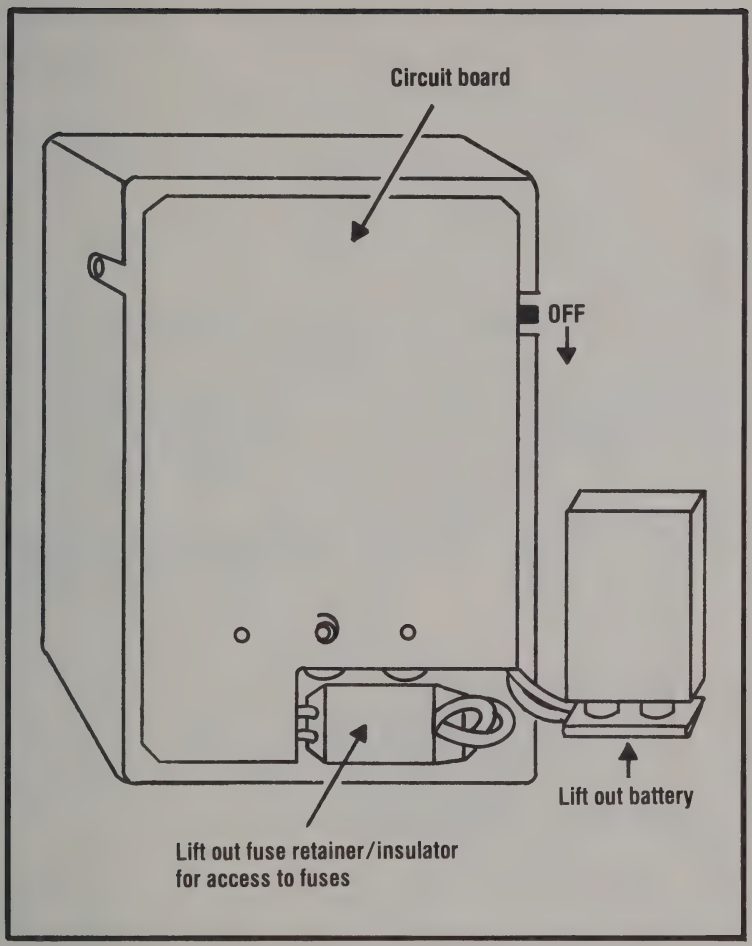

Fig. 4. Fuse replacement, back cover removed.

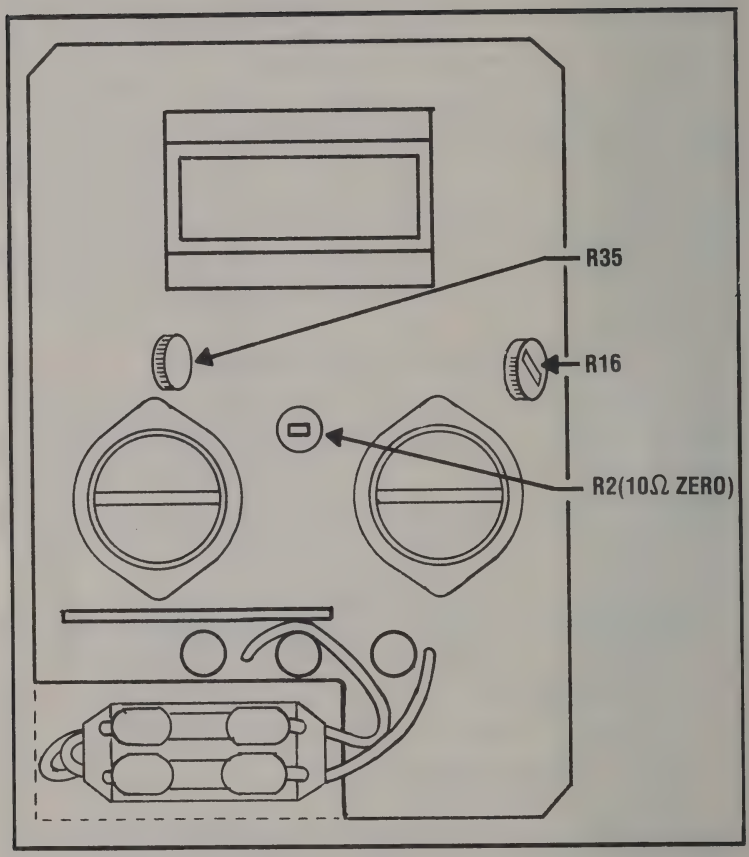

Fig. 5. Calibration adjustment locations, front cover removed.

WARRANTY SERVICE INSTRUCTIONS

1. Refer to the MAINTENANCE section of your B & K-PRECISION instruction manual for adjustments that may be applicable.

2. If the above-mentioned procedures do not correct the problem you are experiencing with your unit, pack it securely (preferably in the original carton or double-packed). Enclose a letter describing the problem and include your name and address. Deliver to, or ship PREPAID (UPS preferred) to the nearest B & K-PRECISION authorized service agency (see list enclosed with unit).

If your list of authorized B & K-Precision service agencies has been misplaced, contact your local distributor for the name of your nearest service agency, or write to:

Service Department

B & K-Precision Product Group
DYNASCAN CORPORATION
6460 West Cortland St.
Chicago, Illinois 60635

LIMITED ONE-YEAR WARRANTY

DYNASCAN CORPORATION warrants to the original purchaser that its B & K-PRECISION product, and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

DYNASCAN will, without charge, repair or replace, at its option, defective product or component parts upon delivery to an authorized B & K-PRECISION service contractor or the factory service department, accompanied by proof of the date of purchase in the form of a sales receipt.

To obtain warranty coverage, this product must be registered by completing and mailing the enclosed warranty registration card to DYNASCAN, B & K-PRECISION, P.O. Box 35080, Chicago, Illinois 60635 within five (5 days) from the date of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. It is void if the serial number is altered, defaced or removed.

DYNASCAN shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may also have other rights which vary from state to state.

For your convenience we suggest you contact your B & K-PRECISION distributor, who may be authorized to make repairs or can refer you to the nearest service contractor. If warranty service cannot be obtained locally, please send the unit to B & K-PRECISION Service Department, 6460 West Cortland Street, Chicago, Illinois 60635, properly packaged to avoid damage in shipment.

TEST INSTRUMENT SAFETY

(continued from inside of front cover)

5. On test instruments or any equipment with a 3-wire AC power plug, use only a 3-wire outlet. This is a safety feature to keep the housing or other exposed elements at earth ground.

6. If possible, familiarize yourself with the equipment being tested and the location of its high voltage points. However, remember that high voltage may appear at unexpected points in defective equipment.

7. Also remember that AC line voltage is present on some power input circuit points such as on-off switches, fuses, power transformers, etc., even when the equipment is turned off.

8. Never work alone. Someone should be nearby to render aid if necessary. Training in CPR (cardio-pulmonary resuscitation) first aid is highly recommended.

6460 W. Cortland Street, Chicago, Illinois 60635

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